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ABSTRACT

This report contains state-by-state information on educational policies related to science and mathematics education at the elementary and secondary levels. The information was collected through the cooperation of the State Network on Science/Mathematics Indicators, which includes professional staff in each state department of education. The report summarizes current state policies related to science and mathematics in four areas. These are: (1) policies affecting the amount of instruction at elementary and secondary levels; (2) requirements for the certification of teachers; (3) recent policy initiatives on alternative certification and staff development; and (4) student testing in science and mathematics. The report includes documentation in tabular form of eight specific sets of data collected as a part of the survey. (TW)

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Council of Chief State School Officers
State Education Assessment Center

Science and Mathematics Indicators Project

STATE EDUCATION POLICIES RELATED TO SCIENCE AND MATHEMATICS*

November, 1987

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STATE EDUCATION POLICIES RELATED TO SCIENCE AND MATHEMATICS

Introduction

Many states have recently instituted education policy reforms that are aimed at improving science and mathematics education. State commissioners of education and their staffs have been working to implement these reforms as well as to improve information by which the quality of education can be monitored. In 1984, the Council of Chief State School Officers adopted a far-reaching position on the responsibility of the states for leading educational assessment and evaluation, and the following year, CCSSO established the State Education Assessment Center to coordinate the development, analysis, and use of state-level data.

With support of the National Science Foundation, the Center began a project in 1986 to develop state indicators of the condition of science and mathematics education in elementary and secondary schools. The goals of the project are: 1) to improve the quality and usefulness of data on science and mathematics education to assist state policy-makers and program managers in making more informed decisions, and 2) to develop a system of indicators that provides the capacity for state-to-state comparisons of science and mathematics education as well as a national database to assess the condition of education in these subjects.

The first major step in the project was to determine the status of state policies that affect science and mathematics at the elementary and secondary levels and to identify the kinds of data that states collect that can be used

in monitoring education in science and mathematics. An "Inventory of State Indicators of Science and Mathematics Education" was conducted in spring 1987. Results of recent surveys on state education policies by several national-level organizations, such as the Education Commission of the States, the National Governors Association, and the National Science Teachers Association, were referenced in the "inventory" to reduce the extent of new reporting of state policies.

This report summarizes current state policies related to science and mathematics in four areas: a) policies affecting the amount of instruction at elementary and secondary levels; b) state requirements for the certification of teachers; c) recent state policy initiatives on alternative certification and staff development; and d) state student testing in science and mathematics. (A subsequent report will list the types of data on science and mathematics education collected by states.)

Policies on Amount of Instruction in Science and Mathematics

All fifty states, the District of Columbia, and three extra-state jurisdictions reported on state policies concerning amount of instruction in science and mathematics. Table 1 lists the 26 states that reported having a state policy which provides direction or guidance to local school districts on the amount of time that should be spent on elementary science and mathematics. The states typically divide their direction or guidance between lower and upper elementary grades. For science, most states recommend from 100 to 150 minutes per week for kindergarten through grade three (i.e., 20-30 minutes per day) and from 175 to 225 minutes per week for grades four through eight (i.e., 35 to 45 minutes per day). For mathematics, most states recommend from 225 to 300

minutes per week for the lower grades (i.e., 45 to 60 minutes per day) and from 250 to 300 minutes per week (i.e., 50 to 60 minutes per day) for the upper grades.

Table 2 displays the state high school graduation requirements in science and mathematics. Of the 54 states and other jurisdictions, 47 reported having state course credit requirements in science and mathematics as of June, 1987. Six states have no state-level course requirements in science or mathematics, leaving graduation requirements to be set by local school districts. Of the 47 with requirements, 36 reported a requirement of two course credits in mathematics, and 39 require two course credits in science. Eleven states require three math courses and four require three science courses. In June of 1987, 12 states offered an advanced or honors diploma that typically required more course credits and/or advanced courses in science and mathematics. Current state policies on high school graduation show a significant increase in science and mathematics requirements for all students as well as a rise in the number of states offering advanced or honors diplomas, requiring more science and mathematics.*

Teacher Certification Requirements in Science and Mathematics

The fifty-four states and other jurisdictions reported their requirements for teacher certification at three levels: elementary, secondary, and middle school/junior high. The requirements displayed in Tables 3-5 should be viewed with three notes in mind. In some states, certification requirements establish a minimum standard, and teacher education institutions often set higher standards for required course credits. Second, our information includes only

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* Education Commission of the States, "Clearinghouse Notes: Minimum High School Graduation Requirements in the States," Denver, Colorado, 1984.

total number of course credits required in science, mathematics, and secondary science fields; some states have requirements which include taking specific types of courses within those fields. Third, in some states, teachers can receive endorsements to teach specific science or math courses, in addition to their major field of certification. Requirements for these endorsements are not reported here.

Of the 40 states listed in Table 3 with elementary mathematics course requirements, twelve states require 5 to 6 credits and two require 8 to 12 credits. Of the 39 states with science requirements, seven states require 5 to 6 credits and seven require 7 to 12 credits. Six states require a combination of credits in science and mathematics, varying from 6 to 21 credits required. In ten states, elementary certification requirements are set by teacher education institutions or through approved, competency-based programs. Twenty-six of the 54 states and jurisdictions require elementary teaching methods courses specifically for science or mathematics.

Table 4 lists state requirements for secondary certification in mathematics and science fields. For certification in mathematics, 21 states and jurisdictions require from 18 to 24 semester course credits; 14 require from 27 to 34 credits, and four require from 36 to 45 credits. Forty-two states offer a broad-field certification in science (i.e., certification to teach any secondary science course). The college course credit requirements for broad-field certification vary from 18 to 60. Fifty-one states and jurisdictions offer certification in the fields of biology, chemistry, and physics; 47 offer certification in earth science; and 42 offer certification in general science. The number of semester course credits required in each field of certification varies from 12 to 45. Thirty-five states have a requirement for secondary teaching methods specifically for science or mathematics.

Requirements for supervised teaching experience vary widely, with the most common being 5 to 6 semester credits in 18 states.

In Table 5, the state requirements in science and mathematics are listed for those states that have a separate middle school/junior high teacher certification. Approximately half of the reporting states and jurisdictions (26) have a middle school/junior high certification. Eighteen states have specific requirements for science and math course credits, with the number of of required credits varying from 12 to 36. Fourteen of the 26 states have a requirement for a course in teaching methods in science or mathematics at this level. Supervised teaching experience requirements are typically the same as a state's requirements for secondary certification, and in four states elementary or secondary experience meets the requirement for middle school /junior high certification.

Policies on Alternative Certification

With shortages of qualified science and mathematics teachers, many states have established policies to allow an alternative method of certifying teachers. These policies are generally distinguished from temporary or emergency certification by specifying that the candidate must enroll in a teacher preparation program that will lead to a standard teaching credential within a set period of time.

Table 6 shows that 24 states reported having an alternative certification program which is at least partly designed to help increase the number of science and mathematics teachers. Most of the state programs include additional course work and supervised teaching over a one to two year period.

Staff Development in Science and Mathematics

To improve the knowledge and skills of science and math teachers, states have created staff development and inservice programs designed specifically for teachers in these fields. A total of 30 states and other jurisdictions reported having staff development activities for science or mathematics teachers as of June, 1987. Many of the state activities have been supported by federal funds under Title II of the Education for Economic Security Act (EESA).

Student Testing in Science and Mathematics

Table 8 displays state-by-state information on student achievement testing in science and mathematics. The state tests are categorized as "assessment tests" and "competency tests." These categories were also used by CCSSO in a 1984 survey of state tests. Although the categories are broad, they provide a means of broadly grouping different tests according to their purposes in states. Several states also have "course specific" tests, and these states are listed in a footnote to Table 8.

Assessment tests in science are in place, or being implemented, in 29 states, and in math, in 40 states. Thirty states have, or will have, competency tests in mathematics, and six states have, or will have, competency tests in science. Nineteen states have, or will have, a testing requirement in mathematics or science for high school graduation.

Table 1

State Direction/Guidance on Elementary Class Time To Be Spent on Science and Mathematics

(As of June, 1987)

	SCIENCE	MATHEMATICS
ALABAMA	K - 3: 150 min/wk 4 - 6: 225 min/wk 7 - 8: 275 min/wk*	1 - 6: 225 min/wk 7 - 8: 250 min/wk*
ALASKA	Lower Elem: 150-250 min/wk Upper Elem: 150-300 min/wk	Lower Elem: 60-225 min/wk Upper Elem: 175-250 min/wk
ARKANSAS	1 - 3: 300 min/wk (& Soc. Living) 4 - 6: 150 min/wk	1 - 3: 225 min/wk 4 - 6: 300 min/wk
CALIFORNIA	1 - 6: 200 min/wk	1 - 3: 200 min/wk 4 - 6: 250 min/wk
COLORADO	Lower Elem: 150 min/wk Upper Elem: 200 min/wk Mid Schl/Jr H: 225 min/wk (Task Force Recommendation)	
CONNECTICUT	1 - 3: 75-150 min/wk 4 - 5: 135-200 min/wk 6 - 8: 250-300 min/wk	1 - 3: 225 min/wk 4 - 6: 300 min/wk 7 - 8: 5 periods/wk
DELAWARE		200-225 min/wk*
DIST. OF COLUMBIA	135 min/wk*	225 min/wk*
INDIANA	1 - 3: 150 min/wk 4 - 6: 180 min/wk 7 - 8: 200 min/wk	1 - 3: 225 min/wk 4 - 6: 225 min/wk 7 - 8: 200 min/wk
IOWA	1 - 3: 100 min/wk 4 - 6: 150 min/wk 7 - 8: 250 min/wk	
KENTUCKY	1 - 4: 120 min/wk 5 - 8: 225 min/wk	1 - 4: 300 min/wk 5 - 8: 225 min/wk
LOUISIANA	1 - 3: 225 min/wk (& Soc. Stud.) 4 - 6: 225 min/wk 7 - 8: 250-275 min/wk*	1 - 6: 300 min/wk 7 - 8: 250-275 min/wk*
MICHIGAN	K - 3: 6 percent 4 - 6: 9 percent	K - 6: 15 percent (Schl yr= 900 hrs)

	SCIENCE	MATHEMATICS
MINNESOTA	1 - 6: 100 min/wk (approximately)	1 -6: 135 min/wk (approximately)
MISSOURI	1 - 3: 150 min/wk 4 - 8: 200 min/wk	1 - 8: 300 min/wk
NEW HAMPSHIRE	K- 3: 110 min/wk 4 - 6: 160 min/wk 7 - 8: 200 min/wk	K - 3: 200 min/wk 4 - 6: 250 min/wk 7 - 8: 300 min/wk
NEW MEXICO	4 - 6: 240 min/wk	1 - 6: 300 min/wk*
OKLAHOMA		1 - 8: 300 min/wk*
OREGON	K - 3: 7 percent 4 - 8: 10 percent	1 - 8: 15 percent
SOUTH CAROLINA	1 - 6: 125 min/wk 7 - 8: 200 min/wk	1 - 3: 225 min/wk 4 - 8: 250 min/wk
TENNESSEE	K - 8: Continuous program	1 - 3: 240 min/wk 4 - 8: 300 min/wk
TEXAS	K: Part of curriculum 1 - 3: 100 min/wk 4 - 6: 225 min/wk	K: 20 percent 1 - 6: 300 min/wk
UTAH	K - 6: 150 min/wk*	K- 6: 150 min/wk*
VIRGIN ISLANDS	1 - 6: 90 min/wk	1 - 6: 100 min/wk
WEST VIRGINIA	K - 4: 80-110 min/wk 5 - 8: 190-260 min/wk	K - 4: 250-300 min/wk 5 - 8: 225-240 min/wk
WISCONSIN	1 - 2: 100 min/wk 3 - 4: 150 min/wk 5: 175 min/wk 6: 250 min/wk	K: 10% (Math & Sci) 1 - 6: 250 min/wk

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Note:

* State direction or guidance originally expressed as minutes per day.

Table 2

State Requirements in Mathematics and Science for High School Graduation

(For class of 1987 unless specified)

	Courses for Regular Diploma		Courses for Advanced/Honors Diploma	
	Math	Science	Math	Science
ALABAMA (89)	2	2	3	3
ALASKA	2	2		
ARIZONA	2	2		
ARKANSAS (88)	5 combined			
CALIFORNIA	2	2		
COLORADO	Local board			
CONNECTICUT	3	2		
DELAWARE	2	2		
DIST OF COLUMBIA	2	2		
FLORIDA	3	3	4	4
GEORGIA (88)	2	2	3	3
GUAM	3	3		
HAWAII	2	2		
IDAHO (88)	2	2		
ILLINOIS (88)	2	1		
INDIANA (89)	2	2	4	3
IOWA	Local board			
KANSAS (89)	2	2		
KENTUCKY	3	2	4	3
LOUISIANA (88)	3	3		
MAINE (89)	2	2		
MARYLAND (89)	3	2	3	3
MASSACHUSETTS	Local board			
MICHIGAN	Local board			
MINNESOTA	0*	0*		
MISSISSIPPI (89)	2	2		
MISSOURI	2	2	3	3

	Courses for Regular Diploma		Courses for Advanced or Honors Diploma	
	Math	Science	Math	Science
MONTANA	2	1		
NEBRASKA	Local board			
NEVADA	2	1		
NEW HAMPSHIRE	2	2		
NEW JERSEY (90)	3	2		
NEW MEXICO	3	2		
NEW YORK	2	2	2*	2*
NORTH CAROLINA	2	2		
NORTH DAKOTA	2	2		
OHIO	2	1		
OKLAHOMA	2	2		
OREGON	2	2		
PENNSYLVANIA (89)	3	3		
PUERTO RICO	2	2		
RHODE ISLAND (89)	2	2	3	2
SOUTH CAROLINA	3	2		
SOUTH DAKOTA (89)	2	2		
TENNESSEE	2	2	3	3
TEXAS	3	2	3	3
UTAH (88)	2	2		
VERMONT	5 combined			
VIRGINIA (88)	5 combined		3	3
VIRGIN ISLANDS	2	2		
WASHINGTON (89)	2	2		
WEST VIRGINIA	2	2		
WISCONSIN	2	2		
WYOMING	Local board			

Notes:

* New York State Regents courses for credit toward Regents diploma. Minnesota has no state requirements for grades 10-12, 1 math and 1 science required for grades 7-9.

Combined = 3 math and 2 science or 2 math and 3 science.
Local board = Requirements determined by local school boards.

Table 3

State Certification Requirements in Science and Mathematics for Elementary Teachers

(Requirements as of June, 1987)

	Course Credits		Teaching Methods: Science/Math	Supervised Teaching Experience
	Science	Mathematics		
ALABAMA	12 combined		No	300 hrs
ALASKA	None	None	No	None
ARIZONA	None	None	Yes	Yes
ARKANSAS	9	6	Yes(S)	12 wks
CALIFORNIA	21 combined		No	**
COLORADO	None	None	Yes	400 hrs
CONNECTICUT	3	3	No	6
DELAWARE	6	6	Yes	6
DIST. OF COLUMBIA	6	9	Yes	1 sem
FLORIDA	6 - 12 combined		Yes(M)	6
GEORGIA	10 Qtr	10 Qtr	Yes	15 Qtr hrs
GUAM	4	4	No	None
HAWAII	*	*	*	*
IDAHO	8	6	No	6
ILLINOIS	7	5	No	5
INDIANA	6	6	Yes(M)	9 wks
IOWA	None	None	Yes	Yes
KANSAS	12 combined		No	*
KENTUCKY	12 combined		Yes(S)	8
LOUISIANA	12	6	No	9
MAINE	*	*	Yes	6
MARYLAND	12	6	Yes	None
MASSACHUSETTS	None	None	No	300 hrs
MICHIGAN	None	None	No	6
MINNESOTA	*	*	Yes	1 Qtr
MISSISSIPPI	15 combined		Yes(S)	6
MISSOURI	5	5	Yes	8
MONTANA	9 Qtr	9 Qtr	Yes	10 wks
NEBRASKA	*	*	*	520 hrs
NEVADA	None	None	No	8

	Course Credits		Teaching Methods:	Supervised Teaching
	Science	Mathematics	Science/Math	Experience
NEW HAMPSHIRE	*	*	*	*
NEW JERSEY	None	None	No	*
NEW MEXICO	12	6	Yes	6
NEW YORK	None	None	No	Yes
NORTH CAROLINA	*	*	Yes	6
NORTH DAKOTA	None	None	Yes	8
OHIO	*	*	No	***
OKLAHOMA	2 courses	1 course	Yes	12 wks
OREGON	None	12	No	15 Qtr
PENNSYLVANIA	*	*	No	*
PUERTO RICO	6	3	Yes	3(S)5(M)
RHODE ISLAND	None	None	Yes	6
SOUTH CAROLINA	12	6	No	6
SOUTH DAKOTA	4	2	No	6
TENNESSEE	18 Qtr	9 Qtr	Yes(M)	8 Qtr
TEXAS	3	3	No	6
UTAH	*	*	*	*
VERMONT	None	None	Yes	None
VIRGINIA	6	6	No	6
VIRGIN ISLANDS	None	None	No	Yes
WASHINGTON	6	6	Yes	None
WEST VIRGINIA	None	None	No	None
WISCONSIN	*	*	Yes	5
WYOMING	1 course	1 course	No	1 course

Notes:
Course credits = Semester credit hours, unless otherwise specified (qtr = quarter credit hours)

* Determined by approved/competency based program or degree granting institution

** 1 semester full time or 2 semesters half-time

*** Supervised teaching experience and 300 hours clinical experience.

Table 4

State Certification Requirements for Secondary Science and Mathematics Teachers

(Requirements as of June, 1987, unless specified)

	Course Credits by Certification Field					Teaching Methods: Science/ Math	Superv. Teaching Exper.
	Math	Science, Broad-field	Biology Chemist. Physics	Earth Science	General Science		
ALABAMA	27	52	27	27	27	Yes	9
ALASKA	None	None	None	None	None	No	None
ARIZONA	30	30	30	30	30	Yes	8
ARKANSAS	21		24	24	24	No	12 wks
CALIFORNIA	45		45			No	***
COLORADO	*	*	*	*	*	Yes	400 hrs
CONNECTICUT	18		18	18	21	No	6
DELAWARE	30		39-45	39	36	Yes	6
DIST OF COLUMBIA	27	30	30	30	30	Yes	1 sem
FLORIDA	21		20	20	20	Yes(S)	6
GEORGIA (9/88)	60 qtr	45 qtr	40 qtr	40 qtr		Yes(M)	15 qtr
GUAM	18	18				No	None
HAWAII	*		*	*	*	*	*
IDAHO	20	45	20	20		No	6
ILLINOIS	24	32	24	24		Yes	5
INDIANA	36		36	36	36	Yes	9 wks
IOWA	24	24	24	24	24	Yes	Yes
KANSAS	*	*	*	*	*	*	*
KENTUCKY	30	48	30	30		No	9-12
LOUISIANA	20		20	20	32	No	9
MAINE	18	18				Yes	6
MARYLAND	24	36	24	24	36	Yes	6
MASSACHUSETTS	36	36	36	36	36	Yes	300 hrs
MICHIGAN	30	36	30	30		No	6
MINNESOTA	**	**	**	**	**	**	1 qtr
MISSISSIPPI	24		32	32	32	Yes(S)	6
MISSOURI	30	30	20	20	20	Yes	8
MONTANA	30 qtr	60 qtr	30 qtr	30 qtr	30 qtr	Yes	10 wks
NEBRASKA	30	45	24	24		Yes	320 hrs
NEVADA	16	36	16	16	16	No	8

	Course Credits by Certification Field					Teaching Methods: Science/ Math	Superv. Teaching Exper.
	Math	Science, Broad-field	Biology Chemist. Physics	Earth Science	General Science		
NEW HAMPSHIRE	*	*	*	*	*	*	*
NEW JERSEY	30	30	30	30	30	No	*
NEW MEXICO	24	24	24	24	24	Yes	6
NEW YORK	24		36	36	36	No	Yes
NORTH CAROLINA	**	**	**	**	**	Yes	6
NORTH DAKOTA	**	**	**	**	**	Yes	8
OHIO	30	60	30	30	30	Yes	***
OKLAHOMA	40	40	40	40	40	No	12 wks
OREGON	21	45	45	45	45	Yes(M)	15 qtr
PENNSYLVANIA	*	*	*	*	*	*	*
PUERTO RICO	30	30	30		30	Yes	3(S)5(M)
RHODE ISLAND	30	30	30		30	Yes	6
SOUTH CAROLINA	24	30	12		18	Yes(M)	6
SOUTH DAKOTA	18	21	12	12	18	No	6
TENNESSEE	36 qtr	48 qtr	24 qtr	24 qtr	24 qtr	Yes	4
TEXAS	24	48	24	24		No	6
UTAH	**	**	**	**	**	Yes	12
VERMONT	18	18	18	18	18	Yes	None
VIRGINIA	27		24	24	30	No	6
VIRGIN ISLANDS	24	NA	NA	NA	NA	No	Yes
WASHINGTON	24	51	24	24		No	15
WEST VIRGINIA	**	**	**	**	**	**	**
WISCONSIN	34	54	34	34	34	Yes	5
WYOMING	24	30	12	12	12	No	1 course

Notes:

Course credits = Semester credit hours, unless otherwise specified (e.g., qtr= quarter credit hours)

* Certification requirements determined by degree-granting institution or approved/competency-based program.

** Major or minor -- North Dakota, Utah; 20-40% of program -- Minnesota, North Carolina; Courses matched with job requirements --West Virginia.

*** 1 semester full-time or 2 semesters half-time -- California; supervised teaching experience and 300 hours clinical/field-based experience -- Ohio.

Blank space = No certification offered

NA = Not Available

Table 5

States with Specific Requirements in Science and Mathematics for a Middle School/Junior High Teacher Certification

(Requirements as of June, 1987)

	Course Credits		Teaching Methods: Science/Math	Supervised Teaching Experience
	Science	Mathematics		
ALABAMA	36	27	Yes	9 credits
ALASKA				
ARIZONA	None	None	No	***
ARKANSAS	18	18	No	12 wks
CALIFORNIA				
COLORADO	*	*	Yes	400 hrs
CONNECTICUT				
DELAWARE				
DIST. OF COLUMBIA	30	24	Yes	1 sem
FLORIDA	18	12	NA	NA
GEORGIA	10 qtr	10 qtr	No	15 qtr
GUAM				
HAWAII				
IDAHO				
ILLINOIS				
INDIANA	18	18	Yes	9 wks
IOWA				
KANSAS	*	*	*	*
KENTUCKY	24	24	Yes	12 wks
LOUISIANA				
MAINE				
MARYLAND				
MASSACHUSETTS	None	None	No	300 hrs
MICHIGAN	18	18	No	***
MINNESOTA	*	*	*	*
MISSISSIPPI				
MISSOURI	21	21	No	***
MONTANA				
NEBRASKA	30	15	Yes(S)	400 hrs
NEVADA				

	Course Credits		Teaching Methods: Science/Math	Supervised Teaching Experience
	Science	Mathematics		
NEW HAMPSHIRE	*	*	*	*
NEW JERSEY				
NEW MEXICO				
NEW YORK	36	18	No	Yes
NORTH CAROLINA	*	*	Yes	6
NORTH DAKOTA				
OHIO				
OKLAHOMA	18	18	No	***
OREGON				
PENNSYLVANIA				
PUERTO RICO				
RHODE ISLAND	18	18	Yes	6
SOUTH CAROLINA	12	12	Yes	6
SOUTH DAKOTA	12	12	No	6
TENNESSEE				
TEXAS				
UTAH	36	36	Yes	*
VERMONT				
VIRGINIA	15	15	No	6
VIRGIN ISLANDS				
WASHINGTON				
WEST VIRGINIA	**	**	**	**
WISCONSIN				
WYOMING	30	24	No	1 course

Notes:

* Determined by approved/competency-based program or degree-granting institution.

** Courses matched with job requirements.

*** Student teaching or 1 year teaching experience -- Arizona; Elementary and secondary teachers eligible for special endorsement -- Delaware, Oklahoma, Michigan, Missouri.

Table 6

State Alternative Certification Programs*

(As of June, 1987)

State	Program Characteristics
ALABAMA	Certified teacher may apply for temporary math permit, 6 semester hours of math yearly for 4 years to complete certification.
ARIZONA	Associate Teacher Authorization, renewable twice, allows holder to teach part-time or one-half year full-time under supervision of certified teacher.
CALIFORNIA	Pass CBEST and NTE, mentor teacher and program to work for certification after 2 years.
CONNECTICUT	Six weeks education training and classroom experience under 90-day provisional certificate, then enter 1 year new teacher support and assessment program.
FLORIDA	On secondary level, 3 week intensive training program and 1 year internship.
GEORGIA	In area of critical need, a science/math major, teacher certification test, performance based assessment, course work and 1 year internship.
INDIANA	Limited license with 15 semester hours science/math, renewable with 6 hours credit each year toward licensure requirements.
LOUISIANA	Louisiana State University program: pass NTE, course work, internship.
MARYLAND	Proposed "alternative programs" approved under Creative Initiatives in Teacher Education.
MISSISSIPPI	On secondary level, provisional certificate until pass NTE, complete 12 hours credit and on-the-job competency
NEW HAMPSHIRE	Pass teacher certification exam, 3 year internship with master teacher.
NEW JERSEY	Pass NTE and subject area test, employment with a training program.
NEW MEXICO	Pass NTE, employment and individualized professional plan.

State	Program Characteristics
NORTH CAROLINA	Lateral entry in area of critical need, employment and examination of qualifications.
OHIO	Proposed "alternative programs" approved under Flexible and Innovative Individualized Program Standard.
OKLAHOMA	Pass teacher certification test, employment and teacher education program.
OREGON	Certified teachers may take NTE subject exam for science/math endorsement.
PENNSYLVANIA	May teach if participating in intern program at institution of higher education.
SOUTH CAROLINA	In area of critical need, summer courses, training workshops in school year and 3 graduate courses within 3 years.
TENNESSEE	Fifth year program for second career persons with part-time classroom teaching.
TEXAS	In area of critical need, pass teacher certification test, course work and 1 year internship with appraisal.
VERMONT	Peer review.
VIRGINIA	On secondary level, pass NTEV, employment and 2 years to complete 9 credit hours.
WEST VIRGINIA	In area of critical need, summer session and 1 year internship.

Notes:

* Programs designed, at least partially, to increase the number of science or mathematics teachers in the state.

Alternative certification program: Teacher preparation program that enrolls noncertified individuals with at least bachelor's degree, offering shortcuts, special assistance, or unique curricula leading to eligibility for a standard teaching credential (Adelman, Nancy E. "An Exploratory Study of Teacher Alternative Certification and Retraining Programs," U.S. Department of Education, October 1986).

Table 7

State-Funded Staff Development Activities for Science or Mathematics Teachers

(Activities as of June, 1987)

State	Type of Activity
ARIZONA	Science/math inservice programs; Title II, EESA, funds for science/math staff development activities*; Teachers Academy for science/math.
CALIFORNIA	California Mathematics Project summer institutes; regional computer centers.
CONNECTICUT	Title II, EESA, funds for science/math staff development activities; Institutes for Teaching and Learning.
DELAWARE	Science/math inservice programs.
DIST. OF COLUMBIA	Science/math inservice programs; elementary science/math resource teacher certification program.
FLORIDA	Science/math summer institute activities.
GEORGIA	Title II, EESA, funds for science/math staff development activities.
GUAM	Special courses set up in response to needs assessment.
IDAHO	Title II, EESA, funds for science/math staff development activities.
INDIANA	Title II, EESA, funds for science/math staff development activities.
IOWA	Title II, EESA, funds for science/math staff development activities.
KANSAS	Title II, EESA, funds for science/math staff development activities.
KENTUCKY	Science/math summer institute activities.
MARYLAND	Science/math courses/staff activities.
MASSACHUSETTS	Science/math inservice programs; Title II, EESA, funds for science/math curriculum seminars.
MICHIGAN	Title II, EESA, funds for science/math staff development activities.

MISSOURI	Title II, EESA, funds for science/math staff development activities.
MONTANA	NSF-funded projects to train math/science leader teachers for local support/inservice.
NEW HAMPSHIRE	Title II, EESA, funds for science/math staff development activities.
NEW JERSEY	Science/math workshop training series; Title II, EESA, funds for science/math staff development activities.
NORTH CAROLINA	Science/math summer institute activities; Title II, EESA, funds for science/math staff development activities.
OHIO	Science/math inservice programs.
PENNSYLVANIA	Title II, EESA, funds for science/math staff development activities.
RHODE ISLAND	Title II, EESA, funds for science/math staff development activities.
SOUTH CAROLINA	Districts may apply for state training funds in service/math.
SOUTH DAKOTA	Title II, EESA, funds for science/math staff development activities; regional inservice programs.
TENNESSEE	Summer career ladder program in science/math; secondary math teacher workshop; science/math inservice activities.
UTAH	Elementary science/math instructional activities; secondary science and 4 levels math endorsement programs; Title II, EESA, funds for science/math activities.
VIRGINIA	Science/math retraining institutes.
WASHINGTON	Science/math inservice programs.

Note:

* Title II EESA: The Education for Economic Security Act, (P.L. 98-377), Title II, 1984, provides grants to states for the purpose of improving instruction in mathematics, science, computer learning, and foreign languages.

Table 8

Student Testing By States in Science and Mathematics

(as of June, 1987, unless specified)

	Assessment Test		Competency Test	
	Grades in Science	Grades in Math	Grades in Science	Grades in Math
ALABAMA	2, 5, 8, 10	2, 5, 8, 10		3, 6, 9, 11 (R)
ALASKA				
ARIZONA		1 - 12		
ARKANSAS		4, 7, 10	6, 8	3, 6, 8
CALIFORNIA	8	3, 6, 8, 12		Age 16 (R)*
COLORADO	3, 6, 9, 11	3, 6, 9, 11		
CONNECTICUT	4, 8, 11	4, 8, 11		4, 6, 8
DELAWARE	11	1 - 8, 11		(R)*
DIST. OF COLUMBIA	1 - 6	3, 6, 8, 9, 11	10 (R)	10 (R)
FLORIDA			3,5(88)8,10	3, 5, 8, 10(R)
GEORGIA	2, 4, 7, 9	2, 4, 7, 9		1, 3, 6, 8,10(R)
GUAM				
HAWAII		3, 6, 8, 10		3, 9 - 12 (R)
IDAHO	8, 11	8, 11		
ILLINOIS	3,6,8(90)10(92)	3,6,8(89)10(91)		
INDIANA	3,6,8,11 (88)	1, 2, 3,6,8,9,11		
IOWA				
KANSAS				2, 4, 6, 8, 10
KENTUCKY				K - 12
LOUISIANA	4, 6, 9		11	3,5,7,11(88)(R 91)
MAINE	4, 8, 11	4, 8, 11		
MARYLAND		3, 5, 8		7, 9 (R)
MASSACHUSETTS	3, 7, 11	3, 7, 11		3, 6, 9
MICHIGAN	4, 7, 10(Sample)	4, 7, 10		
MINNESOTA	4, 8, 11	4, 8, 11		
MISSISSIPPI		3, 5, 8, 11		11 (R 89)
MISSOURI	3 - 10	2 - 10		8
MONTANA				
NEBRASKA				5

(R) Passing score on state test required for graduation.
(R)* Passing score on local competency test, based on state standards, required for graduation.

	Assessment Test		Competency Test	
	Grades in Science	Grades in Math	Grades in Science	Grades in Math
NEVADA				3, 6, 9, 11 (R)
NEW HAMPSHIRE	4, 8, 10	4, 8, 10		
NEW MEXICO	3,5,8,10 (R)*	3,5,8,10 (R)*		
NEW JERSEY		9		9 (R)
NEW YORK		3, 6		9
NORTH CAROLINA	3, 6, 8	1, 2, 3, 6, 8		10 (R)
NORTH DAKOTA	5, 7, 9, 11	3, 5, 7, 9, 11		
OHIO				9 (94)
OKLAHOMA	3, 7, 10	3, 7, 10		
OREGON		8		
PENNSYLVANIA	4, 6, 7, 9,11	4, 6, 7, 9, 11		3, 5, 8
PUERTO RICO		12		4, 6, 9
RHODE ISLAND		3, 6, 8, 10		
SOUTH CAROLINA	4, 5, 7, 9, 11	4, 5, 7, 9, 11	3, 6, 8	1,2,3,6,8,10(R)
SOUTH DAKOTA	4, 8, 11	4, 8, 11		
TENNESSEE	2, 5, 7, 9, 12	2,3,5,6,7,8,9,12		9 (R)
TEXAS				1,3,5,7,9,11(R)
UTAH		5, 11		
VERMONT				8 (R 89)
VIRGINIA	4, 8, 11	4, 8, 11		10 (R)
VIRGIN ISLANDS				
WASHINGTON	4, 8, 10, 11	4, 8, 10, 11		
WEST VIRGINIA	3, 6, 9, 11	3, 6, 9, 11	3, 9	3, 9
WISCONSIN		4, 8, 11		
WYOMING	3, 7, 11	3, 7, 11		

Notes:

Assessment test: State assessment program which is intended to describe a range of knowledge and ability of students in certain curricular areas (CCSSO, 1984).

Competency test: Minimum competency testing program which is intended to demonstrate individual student's ability to meet predefined criteria or standards of performance (CCSSO, 1984).

Course-specific test: New York--State Regents Examinations; North Carolina--End of course tests in science and mathematics.